

In the Claims:

1-43. (Cancelled)

44. Method for the manufacture of hollow body elements such as nut elements for attachment to components normally consisting of sheet metal, in particular for the manufacture of hollow body elements, having an at least substantially square or rectangular outline by cutting individual elements to length from a section present in form of one of a profile bar and a coil after prior piercing of apertures into the section, optionally with subsequent formation of a thread cylinder using a progressive tool having a plurality of working stations in each of which respective operations are carried out, the method comprising:
- a) in a first step, starting from a section rectangular in cross-section, an upsetting process is carried out which leads to a cylindrical recess at a first broad side of the section and to a hollow cylindrical projection at a second broad side of the section opposite to the first broad side, the projection being surrounded by a ring-shape recess,
 - b) in a second step, a web remaining between the base of the cylindrical recess and the base of the hollow cylindrical projection is pierced or punched out to form a through-going aperture,
 - c) in a third step, which is combinable with the second step b), the hollow cylindrical projection is flattened or crushed at its free end for the formation of a piercing section and undercut at the outer side, whereafter the hollow body element is separated from the section and optionally provided with thread.
45. Method in accordance with claim 44, wherein during the upsetting operation of step a), the diameter of the cylindrical recess and the inner diameter of the hollow cylindrical projection are made at least substantially the same.
46. Method in accordance with claim 44, wherein during one of the upsetting process of step a), the piercing process of step b) and the flattening process of

step c), the opening of the cylindrical recess is executed at the first broad side of the section with a rounded or chamfered run-in edge.

47. Method in accordance with claim 44, wherein during one of the upsetting process of step a), the piercing process of step b) and the flattening process of step c), the opening of the hollow cylindrical projection is provided at its free end with a rounded or chamfered run-out edge.
48. Method in accordance with claim 44, wherein during the piercing of the web in accordance with step b), an aperture is produced with a diameter which at least substantially corresponds to a diameter of the cylindrical recess and to an inner diameter of the hollow cylindrical projection.
49. Method in accordance with claim 44, wherein during the upsetting process of the first step a), the free end of the hollow cylindrical projection is provided at an outside with a chamfer.
50. Method in accordance with claim 44, wherein during the upsetting process of the first step a), the recess is provided with a ring-like base region, which stands at least approximately in a plane parallel to the first and second broad sides, is provided at a radially inner side with an at least substantially rounded transition into an outer side of the hollow cylindrical projection and merges at the radially outer side into a conical surface.
51. Method in accordance with claim 50, wherein the conical surface of the ring recess has an included cone angle in a range between 60 and 120°, preferably of approximately 90°.
52. Method in accordance with claim 50, wherein the transition from the ring-shaped region of the ring recess into the conical surface is rounded.
53. Method in accordance with claim 50, wherein a run-out of the conical surface of the ring recess into the second broad side of the section is rounded.

54. Method in accordance with claim 44, wherein during the manufacture of the undercut, this is formed by a cylindrical part of the hollow cylindrical projection, which merges approximately level to the second broad side of the section into a region of the hollow cylindrical projection, which is thickened upon carrying out the step c), and which at least substantially projects beyond the second broad side of the section.
55. Method in accordance with claim 54, wherein the thickened region of the hollow cylindrical projection is made at least substantially conical and diverges away from the first and second broad side.
56. Method in accordance with claim 55, wherein the cone angle of the thickened region of the hollow cylindrical projection lies in a range from 30° and 70°, preferably at approximately 50°.
57. Method in accordance with claim 44, wherein after the flattening process, the hollow cylindrical projection ends at its free end outwardly in a piercing edge, which is provided as a sharp edge.
58. Method in accordance with claim 44, wherein the ring recess is executed with an outer diameter, which is only made somewhat smaller than a smallest transverse dimension of the hollow body element, which is rectangular in plan view, whereby the ring recess with the second broad side of the section forms webs that remain at narrowest points in a plane of the second broad side with a width in a range from 0.25 to 1 mm, preferably at approximately 0.5 mm.
59. Method in accordance with claim 44, wherein during the upsetting process in accordance with step a) a ring-like raised feature is provided at the first broad side of the section around the cylindrical recess.
60. Method in accordance with claim 44, wherein during the upsetting process in accordance with step a) features providing security against rotation are

formed one of outwardly at the hollow cylindrical projection and inwardly in a region of the ring recess around the hollow cylindrical projection.

61. Method in accordance with claim 60, wherein features providing security against rotation are formed by one of ribs and grooves at a radially outer side of the hollow cylindrical projection.
62. Method in accordance with claim 60, wherein features providing security against rotation are formed by ribs, which extend in an axial direction and bridge the undercut of the hollow cylindrical projection.
63. Method in accordance with claim 62, wherein the ribs providing security against rotation have a radial width, which corresponds at least substantially to between 40 % and 90 % of a maximum radial depth of the undercut.
64. Method in accordance with claim 60, wherein features providing security against rotation are formed in the step a) by radially extending ribs, which bridge the ring recess.
65. Method in accordance with claim 60, wherein features providing security against rotation are made in the form of obliquely positioned ribs, which extend in a radial direction over the ring recess and in an axial direction along the hollow cylindrical projection.
66. Method in accordance with claim 60, wherein features providing security against rotation are made in the form of ribs, which extend in a radial direction across the ring recess and in an axial direction along the hollow cylindrical projection.
67. Method in accordance with claim 60, wherein features providing security against rotation are made in the form of recesses, and indeed in step a), step b) or step c), wherein the recesses are arranged in the inclined surface of the ring recess.

68. Method in accordance with claim 44, wherein in step a), likewise starting from the section rectangular in cross-section, a forming process is carried out in which optionally no cylindrical recess is provided at the first broad side of the section, but which leads at the second broad side of the section to a recess at the second broad side of the section, which is preferably polygonal in plan view, in particular square, which surrounds the hollow cylindrical projection that is formed partly from the material displaced during the formation of the recess and partly from the material displaced during the formation of the hollow space of the hollow cylindrical projection, with the recess being provided with one of a ring surface and surfaces set obliquely to a central longitudinal axis of the hollow body element and in the second step b), the material between the first broad side of the section and the base of the hollow cylindrical projection is one of pierced and punched out for the formation of a through-going aperture.
69. Hollow body element for attachment to a component normally comprising sheet metal, the hollow body element comprising:
one of an at least substantially square and rectangular outline with a first broad side and a second broad side forming a sheet metal contact surface, a piercing section, which projects beyond the second broad side and has an undercut and is surrounded by a ring recess having a conical outer surface in the second broad side, wherein the conical outer surface merges into the second broad side,
an aperture, which extends from the first broad side through the piercing section, with the aperture optionally having a thread cylinder, and
features providing security against rotation are formed one of outwardly at the hollow cylindrical projection and inwardly in a region of the ring recess around the hollow cylindrical projection.
70. Hollow body element in accordance with claim 69, wherein the features providing security against rotation are formed by one of ribs and grooves at a radially outer side of the hollow cylindrical projection.

71. Hollow body element in accordance with claim 69, wherein the features providing security against rotation are formed by ribs, which extend in an axial direction and bridge the undercut of the hollow cylindrical projection.
72. Hollow body element in accordance with claim 71, wherein the ribs providing security against rotation have a radial width, which lies at least substantially in a region between 40 % and 90 % of a maximal radial depth of the undercut.
73. Hollow body element in accordance with claim 69, wherein the features providing security against rotation are provided in the form of radially extending ribs, which bridge the ring recess.
74. Hollow body element in accordance with claim 69, wherein the features providing security against rotation are provided in the form of obliquely set ribs providing security against rotation, which extend in a radial direction across the ring recess and in an axial direction along the undercut of the piercing section.
75. Hollow body element in accordance with claim 69, wherein the features providing security against rotation are provided in the form of ribs, which extend in a radial direction across the ring recess and in an axial direction along the undercut of the piercing section.
76. Hollow body element in accordance with claim 69, wherein the features providing security against rotation are provided in the form of recesses, which are arranged in an obliquely set surface of the ring recess.
77. Hollow body element in accordance with claim 69, wherein the second broad side lies in a plane radially outside of the ring recess, and apart from any features at the transitions into the side flanks of the hollow body element.

78. Hollow body element in accordance with claim 69, wherein an opening of the cylindrical recess at the first broad side of the section is executed with one of a rounded and chamfered run-in edge.
79. Hollow body element in accordance with claim 69, wherein an opening of the hollow cylindrical projection is provided at its free end with one of a rounded and chamfered run-out edge.
80. Hollow body element in accordance with claim 69, wherein the ring recess is provided with a ring-like base region, which stands at least approximately in a plane parallel to the first and second broad side, and merges at a radially inner side with an at least substantially rounded transition into an outer side of the hollow cylindrical projection and at a radially outer side into a conical surface.
81. Hollow body element in accordance with claim 69, wherein the ring recess is executed with an external diameter, which is only somewhat smaller than a smallest transverse dimension of the hollow body element, which is rectangular in plan view, whereby the ring recess forms webs with the second broad side of the section that remain at narrowest points in a plane of the second broad side in a range from 0.25 to 1 mm, preferably of approximately 0.5 mm.
82. Hollow body element for attachment to a component normally comprising sheet metal, the hollow body element comprising:
an at least substantially polygon outline with a first broad side and a second broad side,
a piercing section, which projects beyond the second broad side and has an undercut and is surrounded by a ring recess in the second broad side, and
an aperture, which extends from the first broad side through the piercing section, with the aperture optionally having a thread cylinder,
wherein the ring recess is polygonal in plan view and is provided with a plurality of surfaces set obliquely to a central longitudinal axis of the hollow body element, which are inclined away from the central longitudinal axis of

the hollow body element when viewed in a direction from the first broad side to the second broad side.

83. Component assembly comprising a hollow body element in accordance with claim 69, which is attached to a component, for example to a sheet metal part, with the material of one of the component and the sheet metal part contacting a surface of the ring recess of the hollow body element at a surface of features providing security against rotation and also at a surface of the undercut of the piercing section of the hollow body element, and with a ring recess being present in the material of one of the component and the sheet metal part around the piercing section.
84. Component assembly in accordance with claim 83, wherein an axial depth of the ring groove in the sheet metal part is selected in dependence on a length of the piercing section and a thickness of the sheet metal part so that the end face of the piercing section does not project beyond a side of the sheet metal part, which is remote from a body of the hollow body element and is present in a region beneath the second broad side of the hollow body element around the ring recess of the hollow body element.
85. Component assembly in accordance with claim 83, wherein the second broad side of the hollow body element is at least substantially not pressed into the sheet metal material in a region around the ring recess of the hollow body element.
86. Progressive tool for the manufacture of hollow body elements such as nut elements for attachment to components normally comprising sheet metal, in particular for the manufacture of hollow body elements having an at least substantially polygon outline by cutting individual elements to length from a section present in the form of one of a profile bar and a coil after prior piercing of apertures into the section, optionally with subsequent formation of a thread cylinder using a progressive tool with a plurality of working stations, wherein in each case two operations are simultaneously carried out for each stroke of the progressive tool in each working station for the section or for a

plurality of sections arranged alongside one another, wherein an upsetting process is carried out in a first working station for the manufacture of a cylindrical projection at the second broad side, a piercing process is carried out in a second working station by means of a cylindrical piercing punch, a flattening process is carried out in a third working station for the manufacture of an undercut of the cylindrical projection and the separation of in each case two hollow body elements from the section or from each section is carried out in a fourth working station by means of the cut-off punch.